

IARC #41

(1984)

RESULTS

Analytical data for cigarette smoke

Fig. 2 depicts a representative chromatogram of the TSNA in cigarette smoke. Although values for TSNA in cigarette smoke are in good agreement with those obtained earlier by HPLC-TEA, the GC method is preferred because it is faster, less cumbersome and affords a clear separation of NAB from NAT. The GC-TEA method showed that cigarette smoke contains up to 15 ng of NAB and 650 ng of NAT, and it is now being applied to test the efficiency of cigarette filter-tips with respect to selective TSNA removal. It appears the perforation of the filter tip (to dilute the smoke) offers potential for such selective reduction of TSNA in the mainstream smoke.

Table 1 summarizes some of the data obtained from smoke analyses of selected commercial cigarettes with and without filter tips and shows the effectiveness of the filters of cigarettes D and E. At present, we are exploring the physical and chemical conditions which provide optimal selective removal of both volatile and tobacco-specific nitrosamines. In that respect, the degree of smoke dilution obtained by filter perforation and the nature of the plasticizers in the filter tip appear to be dominant factors.

Table 1. Reduction of tobacco-specific *N*-nitrosamines in cigarette smoke by filtration^a

Cigarette	Column smoked/length of cigarette (cm)	"Tar" (ng)	Nicotine (ng)	CO (ng)	NNN (ng)	NNK (ng)	NAT (ng)	TSNA (ng)
A F	50/85	13.0	1.10	15.6	458	360	570	1390
NF	50/65	21.8	1.82	15.0	816	720	1060	2620
		-40%	-40%	+4%	-44%	-50%	-47%	-47%
B F	50/85	14.2	1.31	18.5	324	252	390	966
NF	50/65	22.7	1.84	16.9	533	481	735	1750
		-37%	-29%	+9%	-39%	-48%	-47%	-45%
C F	50/85	13.6	1.15	13.7	505	399	670	1570
NF	50/65	22.5	1.66	12.1	813	727	1020	2620
		-40%	-30%	+13%	-38%	-45%	-39%	-40%
D F	50/85	12.9	1.05	15.3	342	213	352	907
NF	50/65	23.3	1.60	14.9	1110	803	1260	3170
		-45%	-34%	+3%	-69%	-73%	-70%	-71%
E ^b F	50/100	13.4	1.08	12.0	513	249	593	1360
NF	50/73	21.8	1.63	15.0	1760	868	1930	4560
		-39%	-34%	-20%	-71%	-71%	-69%	-70%

^a The percentages are the changes in yields on comparing filtered (F) and non-filtered (NF) smoke.

^b Cigarette E had a perforated filter-tip.

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